View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Almae Matris Studiorum Campus

Agency Theory and Credit Market

Gabriella Chiesa

Problems in borrower-credit relationship

Borrower's Strategic behavior:

Effort Choice (Private benefits extraction)

Risk Choice

Borrower's Information advantage:

Adverse selection

Consequences

1. firm's and loan's riskiness are increasing in the interest rate and leverage

2. firm's value is decreasing in the borrowing rate an firm's leverage

3. The lender's profit is not a monotonic-increasing function of its lending rate: credit rationing

Remedies:

collateral

Firm’s Capital (net-worth)

Borrower’s reputation

The three C of credit analysis: *collateral*, *capital*, *character*

Basic Observation

Lender's payoff, π_F, depends upon the interest rate it charges and also on the borrower's solvency probability:

$$\pi_F = pP$$

where: p is borrower's solvency probability; P is the repayment due:

$$P \equiv (1 + r_L)L$$

r_L is the lending rate, L the loan size.

Question: is the lender's payoff, π_F, increasing in the repayment P ?

The answer depends crucially on the effects of P on the solvency probability.

If

$$\frac{\partial p}{\partial P} < 0$$

that is, borrower's solvency probability is decreasing the repayment. Then we could have that:

$$\frac{\partial \pi_F}{\partial P} < 0$$

in which case, an increase in the lending rate lowers the lender's payoff: scope for credit rationing.

Good reasons for:

$$\frac{\partial p}{\partial P} < 0 \ .$$

These are:

i) borrower's discretion in defining his effort provision (private benefits extraction)

ii) borrower's discretion in defining project (firm's) riskiness;

iii) lender's information disadvantage vis a vis the borrower with regard to the investment project quality (borrower's credit worthiness)

i)-ii) are "*Moral Hazard*" problems; iii) is the "*Adverse Selection*" problem.

Investment Project – Sequence of events

$t = 0$ Financing Contract and Project undertaking: Contract is signed, I is invested

$t = 1$ entrepreneur/borrower's choice of action a

$t = 2$ project result obtains realization of random outcome X

For simplicity: $X \in \{0, x\}$; success: x; failure: 0.

Project outcome distribution (success probab.) depends on: i) entrepreneur's action a; ii) entrepreneur's type ; "type" : credit worthiness.

Project-value enhancing action:

- use of entrepreneur's assets (e.g. patents, real assets..), human capital (effort). This is privately costly to the entrepreneur.

- avoid private benefits extraction. The entrepreneur suffers an opportunity cost (the private benefits he foregoes)

Debt Contract

Notation

r_L lending/borrowing rate, L loan size, P repayment due (at $t = 2$):

$$P \equiv (1 + r_L)L$$

Project outcome $X \in \{0, x\}$; success: x; failure: 0.

Parties' payoffs at the final date ($t = 2$, when project outcome realizes):

Entrepreneur/borrower: max $(X - P, 0)$ – borrower's payoff is convex in X

Lender's payoff : min(P, X) – lender's payoff concave in X

Entrepreneur's/borrower's Strategic behavior

Key point

the decision maker (insider) pursues his own profit:

insider's choice of action, a^*, is that which maximizes insider's profit

$$a^* = \arg\max_a \left[E \left(max \left(X - P, 0 \right) | a \right) - c \left(a \right) \right]$$

insider's choice of action depends on P , i.e. on the lending rate and loan size (leverage).

Simple model

The market safe rate of interest is nil.

Project outcome $X \in \{0, x\}$; success: x; failure: 0.

Insider's action

$$a \in \{H, l\}$$

H : "behaving"; l : "misbehaving"

$$c(H) = c > 0$$

$$c(l) = 0$$

Success prob.

$$\begin{array}{cc} & succ.\ prob. \\ a = H & p_H \\ a = l & p_l \end{array}$$

$a = H$ is value enhancing

$$E(X|H) - c > E(X|l)$$

that is

$$p_H x - c > p_l x \tag{1}$$

Conditional on $a = H$, the project is viable, conditional on $a = L$, it is not viable

$$p_H x - c > I > p_l x \tag{2}$$

*** $a = H$ upgrades success probab. $\Delta \equiv p_H - p_l$, firm value increase, $x\Delta$, exceeds the cost of "behaving".

If the entire project return accrues to the insider, then the action chosen is H, and the project expected return covers the costs, $I + c$.

The entrepreneur (insider), if financially unconstrained, undertakes the project. His expected profit is the net present value of the project:

$$p_H x - (I + c)$$

Outside Finance

The entrepreneur is financially constrained. He has initial "assets", or "net worth" $A < I$. To undertake the project he must borrow $I - A$ – i.e. he needs a loan $L = I - A$.

Questions: will the project be undertaken? What's the entrepreneur's action, profit..?

First observation:

If the project is undertaken, both parties to the finance contract (entrepreneur, lender) make non-negative profits. This is possible if and only if the entrepreneur at date 1 has the incentive to "behave"

Proof

Suppose not, suppose the entrepreneur misbehaves. Then,

i) the entrepreneur's expected profit is:

$$p_l(x - P) - A$$

ii) the lender's expected profit is:

$$p_l P - (I - A)$$

either the lender or the borrower, or both, lose money:

$$p_l x - I < 0$$

Second observation:

The entrepreneur behaves if and only if:

$$p_H(x - P) - c \geq p_l(x - P) \tag{3}$$

inequality (3) is the **insider's incentive constraint**. This requires:

$$x - P \geq \frac{c}{\Delta} \tag{3.a}$$

The incentive constraint

$$x - P \geq \frac{c}{\Delta}$$

requires the insider to earn, conditional on project success, the minimum rent $\frac{c}{\Delta}$

The incentive constraint holds if and only if:

$$P \leq \widehat{P}$$

$$\widehat{P} \equiv x - \frac{c}{\Delta}$$

where $\Delta = p_H - p_l$.

Question: will the project be undertaken?

Yes if the lender's participation constraint holds – lender makes non-negative profits. This requires:

$$p_H \widehat{P} \geq L \equiv I - A$$

that is:

$$A \geq \underline{A} \equiv p_H \frac{c}{\Delta} - (p_H x - I)$$

$$\underline{A} > 0 \Longleftrightarrow p_H x - I < p_H \frac{c}{\Delta}$$

$\frac{c}{\Delta}$ is the minimum rent that the insider must get when the project succeed, for finding it incentive compatible to "behave".

Clearly if $\underline{A} > 0$, then the firm cannot be fully leveraged. More generally the firm's debt capacity is:

$$D^{\mathsf{max}} = p_H \widehat{P} \equiv p_H x - p_H \frac{c}{\Delta}$$

that is, the debt capacity equals the expected value of the firm conditional on the value-increasing action H, that is $p_H x$, minus the expected value of the minimum rent the insider must earn to find it optimal to "behave", $p_H \frac{c}{\Delta}$.

$D^{\text{max}} < I$ (the firm cannot be fully leveraged) if $p_H x - p_H \frac{c}{\Delta} < I$, the same condition for $\underline{A} > 0$.

- There can be credit rationing:

$$\text{Credit Rationing if } \underline{A} > 0$$

Why these results?

■ There exists a ceiling $\widehat{P}$ such that:

$$\text{insider "behaves" if : } \; P \leq \widehat{P}$$

$$\text{misbehavior if : } \; P > \widehat{P}$$

Lender's payoff is $\pi_F(P)$:

$$\pi_F(P) = \begin{array}{l} p_H P \text{ if } P \leq \widehat{P} \\ \\ p_l P \text{ if } \; P > \widehat{P} \end{array}$$

Lender's maximum payoff is $\pi_F(P)^*$:

$$\pi_F(P)^* = \max\left(p_H \widehat{P}, p_l x\right) \; .$$

the lender needs to make non-negative profit:

$$\pi_F(P)^* = \max\left(p_H \widehat{P}, p_l x\right) \geq L$$

this limits the loan size L.

We have that

1. Loan riskiness is increasing in the lending rate and loan size: once the repayment reaches $\widehat{P}$, a further increase leads to a decrease of the solvency probab., from p_H to p_l.

2. Firm value is a decreasing function of the interest rate and leverage: once the repayment reaches $\widehat{P}$, a further increase makes firm value to fall from $p_H x - C$ to $p_l x$.

3. Lender's profit is not a monotonic increasing function of its lending rate: it is increasing in P, for $P < \widehat{P}$, at $P = \widehat{P}$, lender's profit falls because the solvency probab. falls from p_H to p_l.

3. is the key to credit rationing

Borrower's Strategic behavior: Risk Choice

Insider's strategy, a, once the project has been undertaken: take risk, $a = r$, take a safe strategy, $a = s$.

$$a \in \{r, s\}$$

Project outcome distribution conditional on $a = r$:

$$x_r \ \ , \ prob. \ p_r$$

$$0 \ , \ prob. \ 1 - p_r$$

Project outcome distribution conditional on $a = s$:

$$x_s \ \ , \ prob. \ p_s$$

$$0 \ , \ prob \ 1 - p_s$$

where:

$$1 > p_s > p_r \tag{4}$$

$$x_r > x_s \tag{5}$$

***** adding risk, $a = r$, increases the outcome in the event of success, $x_r > x_s$, but success is less likely, $p_r < p_s$.**

Adding risk destroys value:

$$E(X|r) < E(X|s)$$

$$p_r x_r < p_s x_s \tag{6}$$

**** In the absence of outside finance (the insider gets the entire firm value), risk would not be added – the action chosen would be s – , because

$$p_s x_s > p_r x_r.$$

With outside finance, insider takes $a = s$ if and only if:

$$p_s \left(x_s - P\right) \geq p_r \left(x_r - P\right) \quad ,$$

that is if:

$$P \leq \widehat{P}$$

$$\widehat{P} \equiv \frac{p_s x_s - p_r x_r,}{p_s - p_r} \quad .$$

- There exists a ceiling $\widehat{P}$ such that:

$$\text{no-risk is added, } a = s, \text{ if : } \quad P \leq \widehat{P}$$

$$a = r, \text{ if : } \quad P > \widehat{P}$$

Lender's payoff is $\pi_F(P)$:

$$\pi_F(P) = \begin{array}{l} p_s P \text{ if } P \leq \widehat{P} \\ \\ p_r P \text{ if } \ P > \widehat{P} \end{array}$$

Lender's maximum payoff is $\pi_F(P)^*$:

$$\pi_F(P)^* = \max\left(p_s \widehat{P}, p_r x_r\right) \ .$$

the lender needs to make non-negative profit:

$$\pi_F(P)^* = \max\left(p_s \widehat{P}, p_r x_r\right) \geq L$$

this limits the loan size L.

We have that

1. Loan riskiness is increasing in the lending rate and loan size: once the repayment reaches $\widehat{P}$, a further increase leads to a decrease of the solvency probab., from p_s to p_r

2. Firm value is a decreasing function of the interest rate and leverage: once the repayment reaches $\widehat{P}$, a further increase makes firm value to fall from $p_s x - C$ to $p_r x$.

3. Lender's profit is not a monotonic increasing function of its lending rate: it is increasing in P, for $P < \widehat{P}$, at $P = \widehat{P}$, lender's profit falls because the solvency probab. falls from p_s to p_r.

– **Credit can be rationed.**

Boosting the ability to borrow: collateral

Let C denote collateral. The finance contract is (P, C), if the firm is solvent it pays P –repays the debt– if insolvent the lender recovers what's in the firm plus the collateral. Lender's recovery collateral value may be only a fraction of C – we shall denote lender's collateral recovery value βC. In general, $\beta < 1$ – because of legal costs, time...

■ Incentive constraint

The entrepreneur behaves if and only if:

$$p_H(x - P + C) - c \geq p_l(x - P + C) \qquad (3)$$

or, equivalently, iff

$$p_H(x - P) - c - (1 - p_H)C \geq p_l(x - P) - (1 - p_l)C$$

The **insider's incentive constraint** requires:

$$x - P \geq \frac{c}{\Delta} - C \qquad (3.a)$$

The incentive constraint requires the insider to earn, conditional on project success, the minimum rent $\frac{c}{\Delta} - C$: the rent to be earned $\downarrow$

The incentive constraint holds if and only if:

$$P \leq \widehat{P}$$

$$\widehat{P} \equiv x - \frac{c}{\Delta} + C$$

where $\Delta = p_H - p_l$.

■ **The lender's participation constraint – i.e. lender makes non-negative profits – requires:**

$$p_H \widehat{P} + (1 - p_H)\beta C \geq L \equiv I - A$$

that is

$$A \geq \underline{A} \equiv p_H \frac{c}{\Delta} - (p_H x - I) - C\left[1 - (1 - p_H)(1 - \beta)\right]$$

$$\underline{A} > 0 \Longleftrightarrow \left[p_H x - p_H \frac{c}{\Delta}\right] + C\left[1 - (1 - p_H)(1 - \beta)\right] < I$$

where $(1 - p_H)(1 - \beta)$ is the collateral's expected loss due to $\beta < 1$

If $\underline{A} > 0$, then the firm cannot be fully leveraged. With collateral $\underline{A} \downarrow$:

*** collateral boost firm's debt capacity :

$$D^{\max} = p_H \widehat{P} + (1 - p_H)\beta C$$

$$D^{\max} \equiv \left[p_H x - p_H \frac{c}{\Delta}\right] + C\left[1 - (1 - p_H)(1 - \beta)\right]$$

the higher lender's recovery rate, β, the greater the debt capacity.

■ credit rationing is less likely. The higher lender's recovery rate, β, the less likely is credit rationing

Adverse Selection

The insider (borrower) has information advantage on the firm (investment project) with respect to the outsiders.

Outsiders are aware of this.

Simplified version of **Stiglitz Weiss**

Investment project can be either of two types: r, s. Undertaking the project requires a cash outlay I at date 0 (beginning of the period). Insider has no wealth ($A = 0$).

Type r project delivers:

$$x_r \ \ , \ prob.\ p_r$$

$$0 \ , \ prob.\ 1 - p_r$$

Type s gives:

$$x_s \quad , \quad prob.\ p_s$$

$$0\ ,\quad prob.\ 1 - p_s$$

where

$$1 > p_s > p_r \tag{9}$$

$$x_r > x_s \tag{10}$$

Type s is less risky than r , dominates r in expected value

$$E(X|s) > E(X|r)$$

$$p_s x_s > p_r x_r \tag{11}$$

Type s has positive net present value, type r has negative net present value

$$p_s x_s > I\left(1 + r\right) > p_r x_r \tag{12}$$

where r is the safe rate of interest.

Information

♦ Outsiders (potential lenders) have the same information. Their priors:

$$prob(s) = \lambda$$

$$prob(r) = 1 - \lambda$$

♦ The insider (potential borrower) knows the type of project is endowed with – knows whether is s or r.

He undertakes the project if by so doing his profit is strictly positive.

Let P denote debt repayment, i.e.:

$$P \equiv (1 + r_L)L$$

where r_L is the lending rate, L is the loan size. Because the insider's net-worth (capital) is nil, $L = I$.

The insider endowed with project i, where $i \in \{r, s\}$, undertakes the project if:

$$p_i (x_i - P) > 0 \ \ ; \ i = r, s$$

Then:

i) Type s borrows iff:

$$p_s (x_s - P) > 0$$

that is iff:

$$P < x_s$$

ii) Type r borrows if:

$$p_r (x_r - P) > 0$$

that is, iff::

$$P < x_r$$

Therefore, for $P < x_s$, both type s and type r borrow – are willing to accept (sign) a financing contract with repayment P. For $x_s < P < x_r$ only type r borrows.

■ Inference on borrower's type, conditionally on contract (P) being signed

$$prob\,(i|\ \ (P)) \quad , \quad i = s, r$$

Because of i)-ii) :

$$prob\,(s|\ \ (P)) : \begin{array}{l} \lambda \text{ , if } P < x_s \\ \\ 0\text{, if } P > x_s \end{array}$$

$$prob\,(r|\ \ (P)) : \begin{cases} 1-\lambda\ , \text{ if } P < x_s \\ 1, \text{ if } x_s < P < x_r \end{cases}$$

Borrower's solvency probability conditional on signing (P), is p:

$$p : \begin{cases} p = \overline{p} \equiv \lambda p_s + (1-\lambda)\, p_r\ , & \text{for } P < x_s \\ p = p_r\ \ , & \text{for } x_s < P < x_r \end{cases}$$

We then have:

■ **Loan riskiness is an increasing function of the interest rate and leverage (**loan size**).**

Once P has increased so as to reach x_s, solvency probability falls from $\overline{p} \equiv \lambda p_s + (1 - \lambda)\, p_r$ to p_r.

Lender's expected payoff is $\pi_F\,(P)$:

$$\pi_F\,(P) = \begin{cases} \overline{p}P \ \text{ for } P < x_s \\ p_r P \text{ for } \ x_s < P < x_r \end{cases}$$

Lender's profit is not a monotonic increasing function of the lending rate

π_F is increasing in P, for $P < x_s$, for $P \geq x_s$ solvency probab. falls from $\overline{p} \equiv \lambda p_s + (1 - \lambda)\, p_r$ to p_r.

Pooling Equilibrium:

a) **No Lending (Stiglitz-Weiss Credit Rationing):**

this occurs if:

$$p_r x_r < I(1+r) \tag{13}$$

i.e., type r has negative net present value, and the pool is sufficiently bad – the ex-ante prob. of a type s, that is λ, is sufficiently low so that:

$$\overline{p} x_s < I(1+r)$$

(financing the project would give the lender negative profit)

b) **Excessive lending (De Meza-Webb):**

this occurs if inequality (13) holds, i.e. $p_r x_r < I(1+r)$ (type r should not be financed), and the pool is sufficiently good – the ex-ante prob. of a type s, that is λ, is sufficiently high so that:

$$\overline{p} x_s > I(1+r) \ ,$$

which implies that there exists a repayment P :

$$P : \begin{array}{c} \overline{p} P \geq I(1+r) \\ P < x_s \end{array}$$

and therefore there exists a financing contract that gives the lender anon-negative profit.

Both cases, a)-b), are "pooling": borrowers with different project types are "pooled": either no one borrows (case a)), or all borrow at the same terms (case b)).

OBSERVATION

In case b), type s "subsidizes" type r. Lender makes a loss on type r, this loss is compensated by the gain it makes on type s.

$\Longrightarrow\Longrightarrow$ Type s would borrow at better terms if he could *signal* its type

Remedies

Collateral

Signaling

How can type s signal its type?

By offering guarantees (collateral) to such an extent that type r is better off by not mimicking s

Let C denote collateral. Financing contracts are now (P, C) – a contract specifies the repayment, P, and the amount of collateral, C.

(P, C) is signed by s and only by s, iff::

$$p_s (x_s - P) - (1 - p_s)C > 0 \tag{14}$$

$$p_r (x_r - P) - (1 - p_r)C \leq 0 \tag{15}$$

$$p_s P + (1 - p_s)\beta C = I (1 + r) \tag{16}$$

Inequality (14) is the participation constraint of type s. Inequality (16) is the self-selection constraint of type r (having assumed that type r project has negative NPV, i.e. (13)). Equation (16) is the lender's zero-profit condition, conditional on the contract being signed by s (which is true by (14)-(15)).

Conditions (14),(15),(16) identify the separating equilibrium (or, signaling equilibrium) in a competitive environment (lenders make zero profits).

See Figure 1: on the VA$_r$ line the self-selection constraint, i.e. condition (15), holds at equality:

$$VA_r\colon\ P = x_r - \frac{(1 - p_r)\,C}{p_r}\ ,$$

Above the VA$_r$ line, type r makes negative profits (below the VA$_r$ line, it makes positive profits).

On the VP$_s$ line, the participation constraint of type s , condition (14), holds at equality:

$$VP_s\colon\ P = x_s - \frac{(1 - p_s)\,C}{p_s}\ ,$$

type s makes positive profits below the VP$_s$ line.

Let (P^s, C^s) be a point (contract) below the VP$_s$ line and above the VA_r line. Contract (P^s, C^s) gives positive profit to type s and negative profit to type r :

Inference on borrower's type, conditionally on contract (P^s, C^s):

$$prob(s|\ (P^s, C^s)) = 1$$

$$prob(r|\,(P^s, C^s)) = 0\ .$$

On the ZP$_F$ line, condition (16) holds: the lender makes zero profits, conditional on the contract being signed by s :

$$ZP_F: \quad P = \frac{I(1+r)}{p_s} - \frac{(1-p_s)\,\beta C}{p_s}\ .$$

Notice that the ZP$_F$ line : i) crosses the VA$_r$ line below the VP$_s$ line; ii) is less steep than the VP$_s$ line, whenever $\beta < 1$, that is, whenever there are collateral recovery costs. Figure 1 is drawn for $\beta < 1$.

Consider **points (contracts) that are on the ZP$_F$ line on the right-han side of S^*, where S^* is the intersection of** the **VA$_r$ line with the ZP$_F$** line**:**

These contracts have the same properties of (P^s, C^s): are appealing to type s and only to type s, and give the lender a zero profit conditional on the borrower's type s:

$\Longrightarrow$ they satisfy conditions (14)-(16): types are separated (contracts are signed exclusively by type s) and give the lender zero profit.

Let's consider one of these contracts. It gives to type s the payoff π_s :

$$\pi_s = p_s(x_s - P) - (1 - p_s)C \quad ,$$

because the lender makes zero profit, that is:

$$p_s P + (1 - p_s)\beta C = I(1 + r)$$

the payoff type s gets is:

$$\pi_s = [p_s x_s - I(1+r)] - (1-p_s)(1-\beta)C$$

If $\beta < 1$, π_s is decreasing in C. Contract S^* minimizes the amount of collateral and thereby recovery costs $(1-\beta)C$:

$\Longrightarrow$If $\beta < 1$, then S^* is the **unique separating equilibrium**:

S^* **maximizes the profit of type** s **subject to type** r's **self-selection constraint and the lender's zero profit constraint.**

CAPITAL

If the firm has net worth (capital), it will limit the loan size: it will invest its own capital and borrow the residual needed. Capital (outside finance reduction) plays the same role as posting collateral that have no recovery costs, i.e. $\beta = 1$.

And, even if the capital endowment is insufficient for a separating equilibrium, i.e. the equilibrium is pooling, it will be invested so as to minimize loan size: it minimizes the subsidy that type s makes to type r in a pooling equilibrium,

Intermediary (bank)

Monitoring (as a by product of firm-bank relationship)

Screening (find out borrower's credit worthiness)

*** Bank Credit

■ Bank solvency (Sound banking system)

■ Bank capitalization (determinant of bank's borrowing capacity and hence of loanable funds):

Lending Capacity

REFERENCES

Tirole, J. (2006), The Theory of Corporate Finance, Princeton University press, Princeton. Chapters 3-4.

Bhattacharya, S. and A. Thakor (1993), "Contemporary Banking Theory", Journal of Financial Intermediation 3, 2-50.

Djankov, S, O.Hart and A. Shleifer (2006) “Debt Enforcement around the World”, Harvard University, mimeo.

Fabbri, D. and M.Padula (2004), "Does Poor Legal Enforcement Make Househols Credit-constrained?" Journal of Banking and Finance 28, 2369-2397.

Guiso, L., P.Sapienza and L.Zingales (2004), "The Role of Social Capital in Financial Development", American Economic Review 94, 526-556.

Jappelli, T., M.Pagano and M.Bianco (2005), Courts and Banks: Effect of Judicial Enforcement on Credit Markets", Journal of Money Credit and Banking 37, 223-244.

Beck, T., A. Demirguc-Kunt and V.Maksimovic (2004), "Bank Competition and Access to Finance: International Evidence", Journal of Money, Credit and Banking 36, 627-648.

Chiesa, G. (1998) "Information Production, Banking Industry Structure and Credit Allocation", Research in Economics , 52, pp. 409-430.

Djankov, S, O.Hart and A. Shleifer (2006) "Debt Enforcement around the World", Harvard University, mimeo.

We present insolvency practitioners from 88 countries with an identical case of a hotel about to default on its debt, and ask them to describe in detail how debt enforcement against this hotel will proceed in their countries. We use the data on time, cost, and the likely disposition of the assets (preservation as a going concern versus piecemeal sale) to construct a measure of the efficiency of debt enforcement in each country. We identify several characteristics of debt enforcement procedures, such as the structure of appeals and availability of floating charge finance, that influence efficiency. Our measure of efficiency of debt enforcement is strongly correlated with per capita income and legal origin and predicts debt market development across countries. Interestingly, it is also highly correlated with measures of the quality of contract enforcement and public regulation obtained in other studies.

Fabbri, D. and M.Padula (2004), "Does Poor Legal Enforcement Make Househols Credit-constrained?" Journal of Banking and Finance 28, 2369-2397.

This paper analyzes the relation between the quality of the legal enforcement of loan contracts and the allocation of credit to households, both theoretically and empirically. We use a model of household credit market with secured debt contracts, where the judicial system affects the cost incurred by banks to actually repossess the collateral. The model shows that the working of the judicial system affects both the probability of being credit-constrained and the equilibrium amount of debt. In the empirical part, we test our predictions using data on Italian households and on the performance of Italian judicial districts. Controlling for household characteristics, unobserved heterogeneity at judicial district level and aggregate shocks, we document that an increment in the backlog of trials pending has a statistically and economically significant positive effect on the household probability of being turned down for credit. Furthermore, we show that moving a household from the high-cost judicial district (in southern Italy) to the low-cost judicial district would reduce his probability of being creditconstrained by 50% on average, other things being equal.

Guiso, L., P.Sapienza and L.Zingales (2004), "The Role of Social Capital in Financial Development", American Economic Review 94, 526-556.

To identify the effect of social capital on financial development, we exploit differences in social capital within Italy. In high social capital areas, households are more likely to use checks, invest less in cash and more in stock, have higher access to institutional credit, and make less use of informal credit. The effect of social capital is stronger where legal enforcement is weaker and among less-educated people. These results are not driven by omitted environmental variables, since we show that the behavior of movers is still affected by the level of social capital of the province where they were born

Jappelli, T., M.Pagano and M.Bianco (2005), Courts and Banks: Effect of Judicial Enforcement on Credit Markets", Journal of Money Credit and Banking 37, 223-244.

The cost of enforcing contracts is a key determinant of market performance. We document this point with reference to the credit market. We start by presenting a model of opportunistic debtors and inefficient courts. According to the model, improvements in judicial efficiency reduce credit rationing and increase lending, while have an ambiguous effect on interest rates, depending on banking competition and on the type of judicial reform. These predictions are supported by panel data on Italian provinces and by cross-country evidence. In Italian provinces with longer trials or large backlogs of pending trials, credit is less widely available than elsewhere. International evidence also shows that the depth of mortgage markets is inversely related to costs of mortgage foreclosure and other proxies for judicial inefficiency.

Beck, T., A. Demirguc-Kunt and V.Maksimovic (2004), "Bank Competition and Access to Finance: International Evidence", Journal of Money, Credit and Banking 36, 627-648.

Theory makes ambiguous predictions about the effects of bank concentration on access to external finance. Using a unique data base for 74 countries of financing obstacles and financing patterns for firms of small, medium, and large size, Beck, DemirgUc-Kunt, and Maksimovic assess the effects of banking market structure on financing obstacles and the access of firms to bank finance. The authors find that bank concentration increases financing obstacles and decreases the likelihood of receiving bank finance, with the impact decreasing in size. The relation of bank concentration and financing obstacles is dampened in countries with well developed institutions, higher levels of economic and financial development, and a larger share of foreign-owned banks. The effect is exacerbated by more restrictions on banks' activities, more government interference in the banking sector, and a larger share of government-owned banks. Finally, it is possible to alleviate the negative impact of bank concentration on access to finance by reducing activity restrictions.

Insights:

Two commonly acknowledged, albeit conflicting predictions on the effect of banks' market power on firms' access to credit. The **structure–performance hypothesis** asserts that more market power leads to lower supply at higher prices. In contrast, the **information-based hypothesis** asserts that more market power increases bank lending to informationally opaque borrowers (Petersen Rajan, 1995)** . In "Bank Competition and Access to Finance: International Evidence," Beck, Demirgu¨ç-Kunt, and Maksimovic (JMCB 2004) investigate which hypothesis survives empirical scrutiny. It is not the first time the question has been addressed in the literature, but BDM have made the most comprehensive study on this issue. Policymakers in developing countries no longer have to rely mostly on results from the U.S. banking market when they formulate policies for their emerging banking markets. They can now learn a lesson from the experience of more than 6000 companies in 74 countries. BDM's results suggest that in more concentrated banking markets (high market power), firms face higher financing obstacles. BDM interpret this finding as evidence in support of the structure–performance hypothesis and emphasize the negative effects of bank market power.

**The Effect of Credit Market Competition on Lending Relationships, by Mitchell A. Petersen; Raghuram G. Rajan (1995)The Quarterly Journal of Economics 110, 407-443

The paper provides a framework showing that the extent of competition in credit markets is important in determining the value of lending relationships. Creditors are more likely to finance credit-constrained firms when credit markets are concentrated because it is easier for these creditors to internalize the benefits of assisting the firms. The paper offers evidence from small business data in support of this hypothesis,

Chiesa, G. (1998) "Information Production, Banking Industry Structure and Credit Allocation", Research in Economics , 52, pp. 409-430.

We analyse credit allocation when limited-liable banks can engage in costly information production about borrowers. When perfectly diversified credit portfolios cannot be constructed, we show that credit allocation depends on bank capital and the number of banks that can operate in the same market. A concentrated banking industry, one where bank capital is held by few banks, is shown to lead to credit allocation closer to the social optimum. Moreover, in the absence of banking industry consolidation, we find that the removal of intra-state entry barriers reduces welfare and not all independent banking organisations that were viable in formerly protected markets remain so when markets are integrated.

Chiesa, G. (2001), "Incentive-Based Lending Capacity, Competition and Regulation in Banking", Journal of Financial Intermediation, 10 , pp.28-53.

This paper studies moral hazard in banking due to delegated monitoring in an environment of aggregate risk and examines its implications for credit market equilibrium and regulation, in a model where banks are price competitors for loans and deposits. It provides a rationale for an incentive-based lending capacity positively linked to the bank's capital and profit margin, for an oligopolistic market structure wherever banks have market power, and for capital requirements. Social-welfare-maximizing capital requirements are lowered in recessions, are higher the more fragmented the banking sector, and are increased when anti-competitive measures are removed. In equilibrium banks earn excessive profits and credit may be rationed.

Fig. 1: Separating Equilibrium

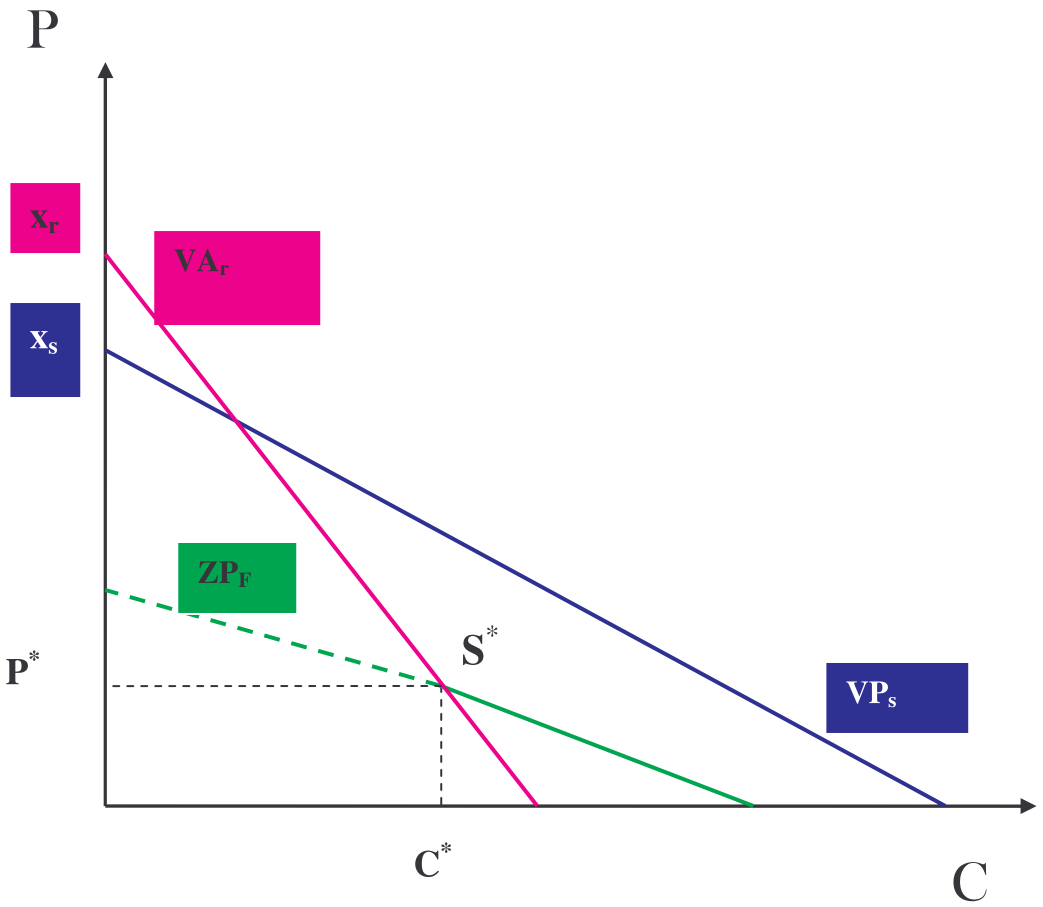

Fig. 1: Separating Equilibrium

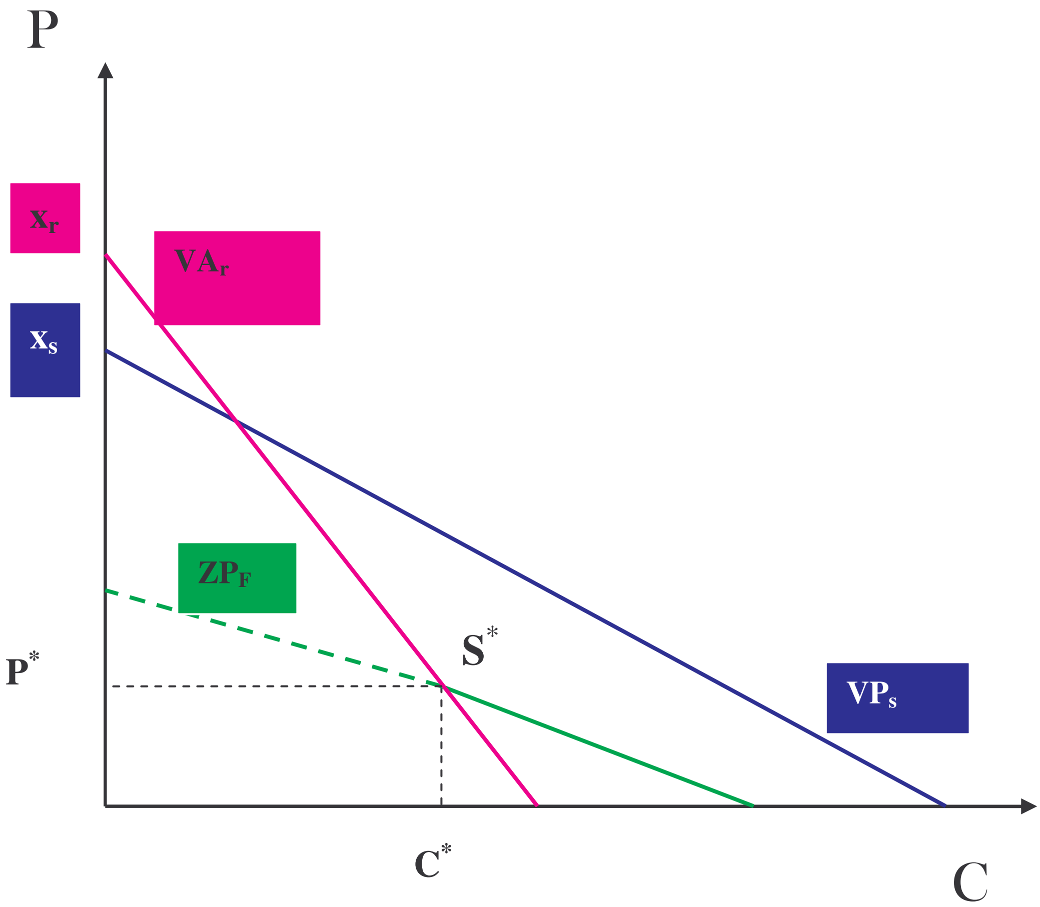

Fig. 1: Separating Equilibrium